

REMARKS/ARGUMENTS

Claims 1-3, 5-6, and 8-27 are pending.

Claims 1-3, 5-6, and 8-16 have been amended.

Claims 4 and 7 have been cancelled.

Claims 26-27 have been added.

Support for the amendments is found in the claims and specification, as originally filed. Support for claim 26 can be found on page 48, ln. 7-9, Example 1 (page 72, ln. 7-8) and Example 2 (page 75, ln. 5-7). Support for claim 27 can be found on page 48, ln. 14-16. Claims 1-3, 5-6, and 8-16 have been amended to improve readability of the claims.

No new matter has been added.

Claims 1-13 and 16 are rejected under 35 U.S.C. 103(a) over Kawahara et al., US 2002/0028871 (Kawahara et al. I) and Ninomiya et al., EP 1085028. Claims 14-15 are rejected Kawahara et al. I, Ninomiya et al., and Kawahara et al., EP 1072616 (Kawahara et al. II). The rejections are traversed for the reasons described below.

The claimed method

Claim 1 is directed to a process for producing a pellet of an ethylene-vinyl alcohol copolymer (EVOH), comprising:

(1) introducing into a vessel an EVOH solution comprising 50 parts by weight or more of an alcohol having a boiling point of 100°C or less with respect to 100 parts by weight of an EVOH, contacting the solution with water vapor in said vessel to let out said alcohol with water vapor and then letting out from said vessel an EVOH hydrous composition containing 0 to 10 parts by weight of said alcohol and 10 to 1000 parts by weight of water with respect to 100 parts by weight of the EVOH;

(2) cutting the EVOH hydrous composition in a molten state let out from said vessel in (1), thereby obtaining EVOH hydrous composition pellets;

(3) introducing the EVOH hydrous composition pellets obtained in (2) into a dryer to reduce a water content of the pellets;

(4) melt-kneading the pellets having the water content reduced in (3), in an extruder;
and

(5) cutting the EVOH discharged from the extruder in (4), thereby obtaining the pellet of the EVOH.

The claimed process provides an effective removal of an alcohol without deteriorating a working environment and peripheral environment and an efficient removal of water in the EVOH hydrous composition thus obtained. The obtained pellets have less thermal degradation upon the removal of water and a uniform shape. See page 86 of the present specification.

In the process of Claim 1, the EVOH hydrous composition let out from a vessel in (1) is cut in a molten state in (2). Additionally, a water content of the EVOH hydrous composition pellets obtained in (2) is reduced in (3), resulting pellets are melt-kneaded in an extruder in (4), and then the EVOH is cut to the pellet of the EVOH in (5).

As described in the specification, a process of cutting in a molten state, as compared to a process of cutting a strand, does not need to consider a take-off speed for stably forming a strand, which leads to a superior productivity of the pellets (see page 24, ln. 9-12). However, a shape of the pellets obtained by cutting an EVOH hydrous composition in a molten state does not necessarily become uniform. When pellet products, obtained by drying the pellets without employing (4) and (5) of claim 1, are used in molding, their shape may not be uniform and, therefore, the extrusion stability may not be sufficient in molding using the dried pellets (see page 4, ln. 13-17 and page 24, ln. 15-16).

In the process of Claim 1, pellets can be non-uniform at the stage after (2) because the pellets are melt-kneaded in an extruder and then cut for pelletizing again in (4) and (5) to

produce a uniform shape. Thus, in terms of productivity of the pellets, a cutting in a molten state (2) is important (see pg. 24, lines 16-21).

Accordingly, in the claimed process, melt-kneading the pellets in an extruder (4) and cutting the EVOH discharged from the extruder (5) are closely linked to cutting in a molten state in (2) in order to obtain superior productivity of the pellets and sufficient extrusion stability in molding using the pellets. Thus, (4) and (5) are important especially when cutting in a molten state as in (2) of claim 1.

The disclosure of the cited references

Kawahara et al. I describe a method for producing an aqueous EVOH composition, which comprises introducing an EVOH solution that contains at least 50 parts by weight, relative to 100 parts by weight of the EVOH therein, of an alcohol having a boiling point of not higher than 100°C., into a vessel, and contacting the solution with water vapor in the vessel, thereby letting the alcohol out along with water vapor and taking the resultant aqueous EVOH composition that contains from 0 to 10 parts by weight of the alcohol and from 10 to 500 parts by weight of water, relative to 100 parts by weight of the EVOH therein, out of the vessel (see [0012]). Kawahara et al. I describe EVOH pellets produced by cutting the aqueous EVOH composition, and that a melt of the aqueous EVOH composition is directly cut (see [0017]). The EVOH pellets are generally dried (see [0076]).

However, Kawahara et al. I do not describe (4) melt-kneading the pellets having a water content reduced in (3), in an extruder; and (5) cutting the EVOH discharged from the extruder in (4), thereby obtaining the pellet of the EVOH.

Ninomiya et al. describe that an EVOH species or EVOH composition is precipitated in the *coagulation bath* to form a strand and that the strand is cut to pellet-like pieces, which are then preferably washed with water (see [0041]). Ninomiya et al. describe that the water content of the EVOH species precipitated in a pellet form and washed with water should be

adjusted to 5 to 60 % by weight, and that the water content of the resulting pellets should be reduced to less than 5% by weight by melt kneading (see [0050]). The melt kneading is carried out by a known melt kneading apparatus and a two screw extruder is particularly preferred (see [0055])

However, Ninomiya et al. do not describe that the EVOH species or EVOH composition, which are to be adjusted to have a water content of 5 to 60% by weight, are produced by cutting the EVOH species or EVOH composition in a molten state. Ninomiya et al. only describe that such an EVOH species or EVOH composition are precipitated in the coagulation bath.

Thus, a skilled artisan would not have been motivated to use (4) and (5) as in the claimed method when a process of cutting in a molten state is employed as in (2) of claim 1 because (i) the process of Ninomiya et al. does not inherently have a problem associated with a shape of the pellets, compared to the pellets obtained by cutting an EVOH hydrous composition in a molten state that do not necessarily become uniform and, therefore, extrusion stability may not be sufficient, and (ii) a skilled artisan would not have recognized the importance of employing (4) and (5) under the situation where cutting in a molten state is employed as in (2) of claim 1 from the process of Ninomiya et al. One would not have reasonably expected to achieve both superior productivity of the pellets and sufficient extrusion stability in molding using the pellets based on the disclosure of the cited references and that the superior productivity and sufficient extrusion stability would have been obtained by combining step (2) with steps (4) and (5).

Kawahara et al. II do not cure the deficiency because Kawahara et al. II do not describe or suggest combining step (2) with steps (4) and (5), as in claim 1.

Concerning claims 26 and 27, a water content of the pellets before being introduced into the extruder in (4) is from 0.1 to 4.5 wt. %. However, e.g., in Ninomiya et al., the water content of the pellets to be reduced by melt kneading is 5 to 60% by weight. ([0050]).

For this reason, a skilled artisan would not have reached the processes of claims 26 and 27 even when Kawahara et al. I and Ninomiya et al. had been combined.

Thus, Kawahara et al. I, Ninomiya et al., and/or Kawahara et al. II do not make the claimed process obvious.

Applicants request that the rejections be withdrawn.

A Notice of Allowance for all pending claims is requested.

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